Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
INQUIRY REGARDING CARRIER	)	**ET Docket No. 03-104**
CURRENT SYSTEMS, INCLUDING	)	
BROADBAND OVER POWER LINE	)	
SYSTEMS	)	
	)	
AMENDMENT OF PART 15 REGARDING NEW	)	
REQUIREMENTS AND MEASUREMENT	)	**ET Docket No. 04-37**
GUIDELINES FOR ACCESS BROADBAND	)	
OVER POWER LINE SYSTEMS	)	

To: The Commission

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Introduction

Numerous individuals and organizations replied to FCC ET Docket 04-37, a Notice of Proposed Rulemaking (NPRM), proposing amendments to Part 15 to further BPL deployment and protect licensed operators from interference. The following is comments on various filings of interest.

Comments of Ameren Energy Communications, Inc.

> Ameren writes: *"AEC opposes the notification and database requirement for BPL systems, contained in proposed § 15.109(g). No other competing broadband provider, such as cable modem service or DSL service, provides to an external party the location of its infrastructure equipment, and, therefore, its customers. Moreover, disclosing the location of BPL equipment would also disclose information about the location of the electric grid and its components, which is very closely guarded for internal utility and national security reasons."*[1]

It's ironic that Ameren considers the grid "closely guarded" but then promotes the use of BPL equipment which acts like a radio beacon, emitting radio signals which could be used to locate equipment with radio-direction finding equipment. Also, another high-tech piece of equipment can be used to locate electric grid equipment. It's called a car. Driving around, one can locate power plants, substations, and also easily identify fiber optic cables enshrouded in neutral power lines. Power grid

1 NPRM Comments of Ameren Energy Corporation, Inc., Page 9

networks can be easily identified on topographical and aviation maps. A public database of BPL equipment which resides on medium voltage lines will not compromise grid security. Last, BPL vendors and carriers have been more than happy to advertise the location of BPL sites in the media and press releases. Viewing newspaper articles on a local BPL trial and having a cursory knowledge of power equipment, I was able to locate the described BPL test site in about 10 minutes. Revisiting the site later with HF receiving equipment, I was able to receive BPL emissions. So, Ameren's claims of security needs is rather baseless.

Ameren also complains that no competing broadband provider is required to provide information on the location of its equipment. I counter that no competing broadband provider uses a communications medium that inherently radiates radio emissions throughout the HF and low band VHF bands, so the analogy to cable and DSL is inapplicable.

> Ameren notes: *"The very concept of adaptive interference mitigation, however, renders unnecessary an expensive and laborious database and reporting requirement to manually locate equipment in the field. It is safe to predict that customers will be reluctant to subscribe to a service that must list the location of their equipment in a publicly-available database."*[2]

The first part of this paragraph doesn't make any sense. Having a database of systems will enable interference victims to properly identify the operators of interfering BPL systems and file complaints. These complaints would trigger use of the adaptive interference mitigation techniques Ameren refers to.

Also, I don't recall anyone stating that customer address information would be a requirement of the database. Ameren appears to be muddying the database issue with non-relevant claims.

> Ameren writes: *"The deployment of BPL in rural and remote areas—one of the major thrusts of this technology—will be handicapped if the system is required to operate under strict emission limits and under complex measurement guidelines. This is dictated by the greater geographic separation of customers in these areas, requiring a greater number of BPL devices to deal with signal attenuation and strict emissions limits simultaneously."*

Licensed users of HF spectrum shouldn't have their communications compromised to enable a questionably tenuous rural deployment business model. Either Ameren and other BPL vendors can comply with the necessary Part 15 measurement requirement, or they can't. It's not the FCC's job to prop up BPL technology with reckless and unsupported relaxing of emissions requirements.

Comments of APPA

> The APPA writes: *"The Association is concerned, however, about the adoption of specific requirements for mitigation. Should the Commission decide to adopt specific requirements for any such mitigation approaches, the Commission must be sensitive to the impact such changes would have on utilities currently testing or deploying BPL systems. Those utilities that have deployed BPL prior to the date of enactment of any FCC BPL rules pursuant to this NPRM should be grandfathered as long as they are compliant with Part 15*

2 NPRM Comments of Ameren Energy Corporation, Inc., Pages 9, 10

rules and are not causing harmful interference. Subjecting utilities to new mitigation requirements after they have deployed BPL services could have a serious financial impact on utilities and may result in them either canceling deployments or significantly slowing them down, resulting in significant financial harm. The key purposes of this proceeding are to promote the development and deployment of this technology, not to hamper them. The Commission should not adopt any rules that would inadvertently counter its stated goal of promoting BPL deployment."[3]

The APPA seems to be confused a bit, suggesting the Commission's primary responsibility is to promote BPL and insure financial success of BPL interests. This is hardly the case, and regardless if the FCC has a stated goal of promoting BPL deployment (which it has clearly pursued with vigor), its objectives of protecting licensees and the public supersedes any such BPL promotion.

"If APPA members were required to provide detailed information on their deployment of BPL systems to a public database, that would raise serious national security concerns. Terrorists and others looking to cause harm would be able to access the database of critical infrastructure information and be able to see how distribution networks were laid out and could potentially be able to disrupt electric service. The availability of this information would give many public power systems pause when considering whether to deploy BPL technology."[4]

APPA members are required to provide information when becoming an FCC licensee, such as when applying for business two-way communications frequencies. This information is a matter of public record and is easily searchable on the FCC website. How is information pertaining to unlicensed Part 15 operations any different?

As mentioned above in the comments regarding Ameren's filing, electrical grid infrastructure is easily identifiable now. If providing BPL system information gives "public power systems pause" as APPA suggests, BPL emissions which broadcast the location of such equipment should give them even more concerns. Considering BPL emits radiation in bands that provide communications for transoceanic flights, FEMA, and numerous federal agencies charged with "homeland security", the mere existence of BPL raises "serious national security concerns" well beyond any disclosure of BPL system information. The APPA seems to be concerns about national security when it affects the bottom line of its members, but glosses over the overall concerns to the general public.

Comments of PPL Telecom

PPL Telecom writes: *"Disclosing precise locations and operating frequencies used by BPL equipment would make it easier for malefactors to damage equipment or deliberately interfere with BPL communications. In the near future, BPL may be used for electric utility SCADA communications. Public disclosure of BPL locations and operating frequencies could expose electric utility operations to risk through deliberate degradation or interruptions of the SCADA communications carried by BPL."*[5]

3 NPRM Comments of American Public Power Association, Page 7
4 NPRM Comments of American Public Power Association, Page 9
5 NPRM Comments of PPL Telcom, LLC, Page 7

As written above in the comments regarding Ameren's security claims, PPL's claims are baseless as well. PPL goes on to mention SCADA communication, however, BPL is not a long-haul technology and would work poorly for long-distance telemetry and control functions, and there's plenty of wireless spectrum available in ISM and UNII bands to enable this. PPL is delusional about "risk through deliberate degradation". BPL is allowed under Part 15 but is afforded no protection for interference, and perhaps PPL should study these regulations before attempting to deploy critical communications carried by BPL. Placing critical services on a Part 15 service does not automatically grant interference protection. PPL should take a cue from the Internet security industry. One basic tenet of Internet security is *"security through obscurity is not security"*.

Perhaps having information on the precise location and frequencies of BPL equipment may lead to easier identification, but PPL has enabled easy identification on all of its test sites so far. I was able to locate PPL's Hanover Township, Bethlehem, PA test site on Jacksonville Road with information provided by articles in the *Morning Call*, a local newspaper. The next day I was able to identify the system operating frequencies using an inexpensive mobile antenna and a modest Amateur Radio transceiver.

Comments of Progress Energy, Inc.

> Progress writes: *"Progress Energy believes that a centralized database (accessible by the public and/or our competitors) is not necessary and not appropriate. The unintended effects of establishing a centralized database would be to allow access to proprietary information by entities that either do not need it, would want it for competitive reasons, or to facilitate specious harmful interference complaints. We are not aware of any other requirements to publish information about other unlicensed radiation sources that conform to FCC Part 15 Rules. Why should BPL be any different?"*[6]

Why should BPL be any different? Has Progress Energy been asleep? There is no other system with the characteristics of BPL -- a large distributed antenna system radiating RF in all directions.

> *"We feel that each Access BPL operator should maintain a database of its own Access BPL system. The information contained in this database should be based upon zip codes, which is consistent with existing reporting requirements for broadband providers. This database should remain private and should not be centralized or maintained by an industry operated entity. This database should not be shared or made public as it will contain proprietary information that could and would likely cause harm to the business operations of the operating entity by allowing inappropriate information to become available to their competitors. Any reported interference complaints should be reported to the operating entity. The operating entity would then be able to utilize this internal database to evaluate the likelihood of the reported interference being related to any Access BPL system and take appropriate actions as necessary."*[7]

Progress Energy seems to fail to realize the main purpose for the database –

6 NPRM Comments of Progress Energy, Inc, Page 7

7 NPRM Comments of Progress Energy, Inc, Pages 7, 8

giving licensed spectrum users the ability to properly identify interfering BPL systems in a timely manner.

> *"With regard to the hams, it appears that they consider any interference to be harmful. It also appears that those that have submitted complaints about Progress Energy's BPL system intentionally seek out interference using very sophisticated and sensitive equipment."*[8]

Progress Energy appears to have a rather arrogant attitude in this regards. Regardless of whether interference is sought out or not, it is interference. It is not up to Progress or any other operator under Part 15 to decide the validity of an interference complaint based on the means by which the interference was discovered. Extending Progress's mentality, mobile operators experiencing interference during normal daily commutes could have their complaints dismissed as they could drive an alternate route and maintain communications. Using the FCC's flawed logic in the NPRM, BPL carriers could tell Amateurs and other licensees to re-orient their antennas. Going further, Progress and others could determine interference is not "harmful" if some Amateur bands are not experiencing interference, and communications can occur on these other interference-free bands. Progress does not have a right to determine how, when, where, or why communications is conducted on licensed HF frequencies no more than Amateurs have a right to determine how they run their nuclear power plants.

BPL vendors and carriers argued in the beginning of the FCC BPL "promotion marathon" that there was no interference because there were no complaints. Since the coverage of the test sites have been very small, it was necessary to bring equipment to the test sites, like Amateur Radio equipment. BPL providers did not seek out Amateurs or any other HF spectrum licensees to research the impact of BPL (that I'm aware of). Now they cry foul when the equipment is brought to their sites and problems are found. I'm curious if Progress considers defects that are found in the work of their subcontractors actually defects if they are "sought out" by inspectors.

The "*sophisticated and sensitive equipment"* Progress refers to is off-the-shelf communications equipment available on the web and through various local and mail-order radio equipment outlets. It is less expensive than typical lab measurement equipment such as spectrum analyzers. Used Amateur equipment on Ebay can be purchased for as little as $300.

> *"First, the interference should have to occur in the normal course of the complainant's operations, rather than be the result of the complainant seeking out the interference. Secondly, the interference should have to be more than momentary. That is, for example, if driving another 30 yards will virtually eliminate the interference, then it is not harmful. Thirdly, the interference should have to be proven to so greatly interfere with operations such that communications are practically unintelligible. Finally, the sensitivity of the measuring equipment must be standardized."*[9]

Again, this is totally baseless and not for Progress to decide the validity of an interference complaint. Progress's example that "...*if driving another 30 yards will virtually eliminate the interference, then it is not harmful"* is laughable, especially

8 NPRM Comments of Progress Energy, Inc, Page 8
9 NPRM Comments of Progress Energy, Inc, Page 9

considering BPL proponents' (and Chairman Powell's) desire to have BPL operating on every power line and outlet in the country. How far is "not too far" to drive to escape BPL interference? 30 yards? 1 mile? 3000 miles? Can Progress dictate where HF licensees should drive to be able to communicate?

Progress's third point is severely flawed. Much of HF communications occurs slightly above the noise floor. It's likely that the level of interference they find acceptable would preclude reception of weak signals and establishment of communications. Progress seems to confuse the meaning of "*harmful*" with "*communications obliterating*". I highly doubt Progress would tolerate interference on their numerous two way radio system frequencies used to dispatch line repair crews and other personnel if it fell just below their definition of "harmful interference". Would it be harmful interference if all of their staff had to repeat all messages twice due to bursts of interference? Perhaps three times? Four times? What if a line repair crew couldn't use their radio at the location where they had a repair job in which they had to remain stationary for several hours? If they could move thirty yards and be able to communicate, would it be "harmful interference"? Just what is Progress's litmus test for "harmful interference" on their licensed frequencies?

If we apply Progress Energy's harmful interference definition to an AM or FM broadcast radio listeners for a moment[10], interference would not be "harmful" unless a song heard on the radio was unidentifiable. If the listener could identify the artist or title of the song, this would not meet Progress Energy's definition of "harmful interference", but it is likely listeners would be livid. Applying this to television, it would not be harmful interference if someone viewing *American Idol* could just barely identify Simon Cowell berating a badly performing contestant, even if the TV picture was full of snow, crosshatching, and distortion and the audio was overrun with buzzing and hash. Again, viewers would most assuredly consider this interference unacceptable and harmful, but Progress would not by its definition.

Taken to the extreme using Progress's flawed logic, BPL carriers could delay or deny interference mitigation if BPL interference affected emergency communications, but it did not meet their criteria of "harmful". Some may counter that when emergency communications is involved BPL carriers would be more cooperative, <u>but BPL carriers do not have the right to judge the validity or severity of interference based on the interference victim's operating habits, location, type of traffic, or any other parameter or belief.</u>

On Progress's fourth point about standardizing the sensitivity of measuring equipment, I wholeheartedly agree. Progress needs to purchase *"sophisticated and sensitive equipment"* on Ebay to fully understand the impact of their system on communications and enjoy the same level of measuring equipment sensitivity that Amateurs have used for years.

I find Progress Energy's comments with regards to the interpretation of "harmful interference" a move of desperation and a sign of a lack of goodwill, in light of their recent interference complaints which are apparently unresolvable. It's unfortunate Progress has given up on their engineers and is now relying on attorneys

10 This example does not imply that BPL interferes with AM or FM broadcast radio, it is merely used for illustration purposes. All BPL vendors as of this writing that I'm aware of have avoided the AM and FM broadcast bands. One has to ask why these bands were avoided as there is no technical reason if one considers BPL proponents' claims of little or no interference potential valid.

to further their BPL efforts. Their definition of harmful interference is way out in left field, and totally out of sync with any reasonable definition of harmful interference that most any communications professional would describe.

Since Progress Energy insists on embarking on this slippery slope of language interpretation, their apparent desire to dictate the operating patterns of licensees affecting their unlicensed, unprotected service, and the mistaken belief that they can enforce their definition of interference on interference victims, and undoubtedly other BPL carriers will take this stance, I suggest the Commission reword 47 C.F.R. § 15.3(m)[11] as such (changes underlined):

> *Harmful interference. Any emission, radiation or induction that endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs, repeatedly interrupts <u>or is found unacceptable by</u> a radiocommunications service operating in accordance with this Chapter, <u>as determined by the affected radiocommunications service.</u>*

If the Commission allows Progress Energy and other Part 15 operators to impose their definition of "harmful interference" on licensees, it elevates Part 15 operations to the same level as licensed operations. This clearly was not the intent of Part 15 which was created to allow devices to operate with an acceptable amount of unintentional emissions, or allow low powered unlicensed devices to operate without disturbing, inconveniencing, or being noticed by licensed operations. In light of the non-commercial nature of Amateur Radio, Progress and other BPL carriers may feel justified in their dismissal or challenge of Part 15 interference complaints from Amateurs. If the Commission decides that Progress Energy's definition of harmful interference is correct and justified, I recommend that all FCC licensees rip up their licenses as they are essentially useless.

Comments on NTIA Study 04-413

On April 27, 2004 the National Telecommunications and Information Administration or NTIA released a study on BPL, Study 04-413, and on June 4, 2004 filed its comments on the NPRM which gave a preview of some of the Phase Two Study findings. The following paragraphs are of significant concern.

Part 15 Measurement Techniques

Several BPL proponents had sought to lessen Part 15 emissions limits. The NTIA however disagreed. The NTIA notes that Part 15 with respect to measurements of BPL may be lacking:

> *"Current Part 15 measurement techniques may significantly underestimate the peak field strength generated by BPL systems as a result of using a loop antenna in the near field; performing measurements with an antenna situated near ground level"*[12]

Protection of Critical Allocations is Needed

11 "47 C.F.R. § 15.3(m) Harmful interference. Any emission, radiation or induction that endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunications service operating in accordance with this Chapter."

12 NTIA Study 04-413, Section 3, Page 3-10

The NTIA goes into excruciating detail on all the licensed services within the bands potentially affected by BPL. The summary below, though, sums up the criticality of these allocations:

> *"Frequencies between 1.7 MHz and 80 MHz are allocated to a total of 13 radio services, with the Federal Government using all but two, in varying degrees, to satisfy various mandated mission requirements. Federal agencies currently have over 59,000 frequency assignments in this frequency range. Allocations for the fixed and mobile services accommodate communications for homeland security, distress and safety, and other critical functions. "*[13]

> *"Both NTIA and FCC have long recognized that certain frequencies or bands in the radio spectrum require special protection from interference because of the critical or sensitive functions they support, including distress and safety, radio astronomy, radionavigation, and others. NTIA identified forty-one (41) such frequency bands between 1.7 MHz and 80 MHz, totaling approximately 4.2 MHz (5.4% of the total spectrum under study), and proposes that they receive special protection from interference by licensed and/or unlicensed transmitters. "*[14]

The suggested protected bands (in kilohertz unless otherwise noted) are:[15]

2173.5-2190.5	5450-5480	8414.25-8414.75	14990-15010
2495-2505	5480-5680	8815-8965	16420-16423
2850-3025	5680-5683	9995-10005	16694.75-16695.25
3023-3026	6215-6218	10005-10100	16804.25-16804.75
3400-3500	6267.75-6268.25	11275-11400	17900-17970
4125-4128	6311.75-6312.25	12290-12293	19990-20010
4177.25-4177.75	6525-6685	12519.75-12520.25	21924-22000
4207.25-4207.75	8291-8294	12576.75-12577.25	25500-25670
4650-4700	8361-8367	13260-13360	37.5-38.25 MHz
4995-5005	8376.25-8386.75	13360-13410	73.0-74.6 MHz
			74.8-75.2 MHz

I agree with the NTIA and urge the Commission to effect full protection of these bands. **The Amateur Radio, Citizen Band, and Shortwave Broadcast bands should also be afforded the same protection**.

Powerlines Do Act Like Antennas

Contrary to the claims of several BPL proponents, powerlines do act like antennas. They do not act strictly like point sources as some have claimed. The NTIA performed both computer modeling of power lines carrying BPL and took measurements at several BPL test sites.[16]

Several key points:

> *"Any impedance discontinuity in a transmission line, which may arise from a BPL coupling device, a transformer, branch or a change in the direction of the*

13 NTIA Study 04-413, Section 4, Page 4-11
14 NTIA Study 04-413, Section 4, Page 4-11
15 NTIA Study 04-413, Section 4, Pages 4-8 through 4-10
16 NTIA Study 04-413 Section 5.3.1, Page 5-3

line, may produce radiation directly or by reflections of signals forming standing waves that are radiated from the conductors"[17]

"Even if the RF energy is injected into one of two or more conductors, the remaining wires generally act as parasitic radiators and, therefore, the lines can act as an array of antenna elements at certain frequencies. Radiation may come from one or more point radiators corresponding to the coupling devices as well as one or more power lines."[18]

Field Measurements Show That Radiation Doesn't Drop Off as Quickly as Claimed

The NTIA conducted field measurements at three active BPL test sites and writes:

"NTIA performed measurements at three different BPL deployment sites in order to characterize the BPL fundamental emissions. Measurements indicate that the BPL electric field does not generally decay monotonically with distance from the BPL source as the measurement antenna was positioned near to and moving along the length of the power line. As the measurement antenna was moved away from the BPL energized power line, the radiated power decreased with increasing distance, but the decrease was not always monotonic and a number of local peaks were observed at some locations. In some cases, the BPL signal was observed to decay with distance away from the power line at a rate slower than would be predicted by space wave loss from a point source."[19]

This supports the claim that BPL is not a point source type of radiator. It can be deduced from this that current Part 15 rules don't adequately address BPL as Part 15 was for the most part created with part sources in mind.

The NTIA observed the importance of the antenna measurement height:

"NTIA's measurements show that the radiated power from the BPL energized power lines was consistently higher when the measurement antenna was placed at a greater height (e.g., 10 meter vs. 2 meter). These results indicate a need to refine the Part 15 compliance measurement guidelines to ensure that the peak field strength of any unintentional BPL emissions is measured."[20]

Some BPL vendors and carriers and perhaps even HF band licensees may be taking measurements that are lower than the peak field strength which is ultimately the concern of Part 15.

Models That Do Not Account for the Neutral Wire may Underestimate Emissions

The NTIA found that a common practice in modeling power lines without the

17 NTIA Study 04-413 Section 5.2.1, Page 5-1
18 NTIA Study 04-413 Section 5.2.1, Page 5-1
19 NTIA Study 04-413 Section 5.5, Page 5-16
20 NTIA Study 04-413 Section 5.5, Page 5-16

neutral wire in computer models may produce inaccuracies:

> *"NTIA's modeling showed that inclusion of a neutral line with three phase medium voltage wiring tended to increase the overall radiation. Thus, models omitting the neutral wire tend to predict lower field strength. The implications of these modeling results are that compliance measurements taken only around a BPL device and at heights below the power lines, may significantly underestimate the peak electric field."*[21]

Calculations of Interference Potential

The NTIA calculated interference potential to several types of stations:

> *"Calculations of close-to-the-line interference potential for vehicular land-mobile receivers due to a BPL transmitter operating at FCC Part 15 limits show that there would be significant increases in the noise floor due to interference...there would be at least a ten-fold increase in total receiver noise power on the street adjacent to the BPL device and power lines.*[22]

> *"NEC interference calculations for an assumed fixed service or mobile base station receiving antenna found substantial (I+N)/N values at greater distances from the line than those found for land mobile receivers. This was especially true at 15 and 25 Mhz.... As can be seen, at 15 MHz the potential for a 3dB (I+N)/N level exists beyond 500 meters away, and at 25 MHz some locations more than 700 meters away could see this level of interference. Additionally, locations past 300 and 400 meters from the BPL-energized line on 15 MHz and 25 MHz, respectively, could experience (I+N)/N levels in excess of 10 dB."*[23]

> *"...an aircraft traveling above or near the modeled BPL deployment area could see substantial S/N degradation. These calculations include parts of the far-field radiation pattern (off the ends of the power lines, or on-axis) that exhibited potentially elevated power gain levels. Further study is needed of representative power line gain levels in skyward directions"*[24]

This level of interference is disturbing, especially to aeronautical stations.

Flawed Measurements from Proprietary BPL Vendor Reports

The NTIA had the privilege of reviewing several "proprietary" field measurement reports, presumably contracted by BPL vendors. These reports have never seen the light of day as they are unavailable for public scrutiny.

> *"NTIA has reviewed three proprietary reports of BPL measurements that were performed by contractors hired by BPL proponents to test compliance of trial BPL systems with Part 15 field strength limits. In all cases involving outdoor overhead power lines, measurements were performed using a one-meter high antenna on radials emanating from a power line pole to which a BPL access device was mounted. While consistent with §15.31(f)(5), this ad hoc*

21 NTIA Study 04-413 Section 5.5, Page 5-16
22 NTIA Study 04-413 Section 6.1, Page 6-11
23 NTIA Study 04-413 Section 6.2, Page 6-15
24 NTIA Study 04-413 Section 6.4, Page 6-20

measurement approach does not demonstrate compliance with the field strength limits because as shown by NTIA's measurements and models, peak field strength levels are not centered at the BPL device and do not occur at a height of one-meter above the ground. Other sources of potential BPL measurement inaccuracies include: the measurement distance and extrapolation factor; frequency-selective radiation effects; estimation of electric fields using a loop antenna; and selection of representative BPL installations for testing."[25]

This indicates that the FCC was probably relying upon erroneous data and formed opinions regarding the technology early on that in light of this finding are perhaps wrong. I strongly urge the FCC to make these studies public.

Aggregation of Signals was Observed and Needs to Be Accounted for in Measurements

The NTIA recognized that as systems scale, aggregation of emissions will be a concern:

"Part 15 specifies that the aggregate emissions from a composite system must satisfy the field strength limits applicable for a single device. As BPL networks are substantially deployed in a community, the aggregated BPL emissions for the overall network are expected to increase above the levels generated by a single BPL device. This aggregation has already been observed by NTIA at one of the trial BPL systems where multiple simultaneous transmissions occur."[26]

"Aggregation of emissions from BPL systems via ionospheric propagation and the associated BPL deployment models require further study. This is of concern in the long-term insofar as skyward emissions from many hundreds of BPL systems deployed over a large region might produce significant composite interfering signal levels at a very distant receiver."[27]

Part 15 Emissions Limits Should Not Be Relaxed and Part 15 Measurement Requirements Should be Refined

Contrary to the requests of many BPL vendors, the NTIA feels that Part 15 emissions limits should not be relaxed:

"The Phase 1 analysis assumed that for outdoor overhead power lines, compliance measurements were performed using a one-meter high measurement antenna. This ad hoc measurement approach does not demonstrate compliance with the field strength limits"[28]

"... potential sources of measurement underestimation of BPL field strength include: the measurement distance and extrapolation factor; frequency-selective radiation effects; estimation of electric fields using a loop antenna; and selection of representative BPL installations for testing"[29]

25 NTIA Study 04-413 Section 7.1, Page 7-1
26 NTIA Study 04-413 Section 7.3, Page 7-2
27 NTIA Study 04-413 Section 9.4, Page 9-4
28 NTIA Study 04-413 Section 7.12, Page 7-8
29 NTIA Study 04-413 Section 7.12, Page 7-8

" In light of the above considerations and the high perceived interference risks, NTIA recommends that field strength limits for BPL systems not be relaxed and that measurement procedures be refined and clarified as described in this section to better ensure compliance. These risk reductions should be effected as quickly as possible in order to better protect radio communications"[30]

Bands That Support Mobile Operations Should be Protected

The NTIA recommends that bands that support mobile stations should be protected from BPL emissions[31]. I fully agree with this as all of the interference mitigation techniques proposed by the NTIA and FCC offer little if any protection to mobile stations, especially aeronautical stations.

NTIA Study Commentary

Looking beyond the politically correct cover letter and executive summary, the NTIA has some very serious information that needs to be considered by the FCC, especially as several key points directly disagree with statements made by the Commission. The NTIA for the most part appears to be neutral and fair in the body of the study. The study verifies many of the claims made by concerned parties in FCC Notice of Inquiry and Notice of Proposed Rulemaking comments.

Much of the material within the NTIA study flies in the face of the Commission's NOI and NPRM. This report should trigger the Commission to backtrack its past statements and promotion of BPL. Clearly the case has been made beyond a reasonable doubt that significant problems exist with BPL technology and the framework for accommodating it needs to be serious restructured.

Conclusion

There is an overwhelming mountain of evidence against BPL which the FCC cannot continue to ignore or nonchalantly brush aside as has been done in the past. Even the NTIA has brought up serious issues which must be dealt with and not swept under the carpet or glossed over with political rhetoric. Compared to the NTIA study, the Commission's Notice of Proposed Rulemaking in regards to supported statements and factual information is anemic. The FCC has had in its possession "proprietary" field measurement studies from BPL vendors or carriers, which undoubtedly were used early on to form crucial opinions on BPL feasibility, and now the accuracy of these measurements have been put into question by the NTIA. This reeks of a lousy and incompetent due diligence process and raises serious questions about the qualifications of the people that are at the helm of the public agency charged with insuring reliable communications for this nation.

Several BPL carriers and vendors seem to want to have their cake and eat it to with regards to Part 15 operation. Many have made public statements that Part 15 compliance is no problem, and interference is a non-issue. But when it comes time to comply, some like Progress Energy want to work on their own convenient terms under their definition of harmful interference. Part 15 was intended to protect

30 NTIA Study 04-413 Section 7.12, Page 7-8

31 Comments of the National Telecommunications and Information Administration on ET Docket 03-104 and ET Docket 04-37, Page 10

licensees, the potential victims of interference, not serve as a vehicle for bypassing the need for licensed allocations. As some of the quotes above show, several carriers seem to believe the information or applications that are carried on their Part 15 operations justifies some kind of protection or that the weakness of their choice of technology can be cloaked in national security when convenient. Others like the APPA arrogantly seem to think BPL promotion and the financial concerns of BPL interests come first.

I would have hoped after the release of the NTIA study that the Commission would have come to its senses and halted the BPL promotion campaign. But this shows no signs of stopping as BPL deployments appear to be going full speed ahead with the FCC's approval and encouragement. Since technical theory, field measurements, and common sense have failed to sway the Commission, perhaps full scale national deployments are really what is needed at this point so the FCC can experience all the problems on a larger scale.